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It has been found in this laboratory that solanione, riboflavin and nicotinic acid upon addition to growth media participate in the mechanism operative in the enzymatic formation of unsaturated fatty acids, and that certain naphthoquinones which are capable of being reversibly oxidized and reduced mediate in the process responsible for the extent of unsaturation of the fat so formed from carbohydrates.

In view of the significance of acetate in the fatty acid synthesis we found it to be of importance to study the utilization of 1-C^{14} acetate for the synthesis of both saturated and unsaturated fatty acids as well as its incorporation into the sterol formed. The possibility had to be considered that the desaturation of fatty acids was a more rapid process when glucose was the starting substrate because the number of hydrogen acceptors obtainable from the degradation products of the glycolysis were more numerous. It was also conceivable that the synthesis of saturated and unsaturated fatty acids proceeds via two separate mechanisms. Since the stepwise addition of acetate or some form of acetate to form saturated fatty acids has also been reported, it appears to be justifiable to conclude that the major pathway for the formation of unsaturated acids in Fusaria is via dehydrogenation of saturated fatty acids. In as much as a more unsaturated fat is derived from glucose, it was postulated that a variety of hydrogen acceptors are formed as a result of the glycolytic process occurring in the presence of glucose, thereby facilitating the desaturation mechanism. With acetate as the sole carbon source, this process is slower due to non-occurrence of glycolysis. If, however, suitable hydrogen acceptors were present it could be expected that a more extensive desaturation would take place. That this was actually the case was indicated by data recorded, from which it could be seen that the addition of glucose to an acetate medium resulted in the formation of a fat possessing an iodine number of 120 which is considerably higher than that found when acetate was the sole carbon source. It is also significantly higher than the value of 87 obtained when the substrate was practically all glucose.

In addition to the above studies, investigations of lignin present in bagasse were carried out. A comparative study of the effect of four wood-destroying fungi of the "brown rot" type on the dissimilation of cellulose in bagasse was continued. The lignins liberated by the cellulolytic action of each of these molds have been characterized and their identity with bagasse native lignin was established. As a further extension to our studies we selected to investigate the lignin from the Japanese tree Paulownia tomentosa, otherwise known as "kiri" wood. To date, nothing has been reported in the literature on the nature of this lignin. Kiri native lignin was isolated in 0.2% yield with ethyl alcohol at room temperature, and was compared with kiri lignins isolated with the aid of 10% alkali and 72% sulfuric acid. The data of this comparison are listed in Table I.

Table I

Lignin	C,%	H,%	OCH_3,%
Native	60.1	6.2	16.6
72% H_2SO_4	61.2	5.6	18.0
10% NaOH	60.9	5.7	17.4

It is readily observable that the methoxyl content of each of the chemical lignins is higher than that of the native lignin fraction. A similar situation was encountered in the study of the native lignin from oak and birch.

In addition, a comprehensive monograph on the Colloid Chemistry of Food Preparation has been written and appeared as part of the HANDBUCH DER KALTETECHNIK, Volume IX, Springer Verlag, 1952, pp. 81-166.

Publications

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3. The Influence of Naphthoquinone on the Mechanism of Fat Formation in Fusarium lycopersici. Arch. Biochem. Biophys. 38, 219 (1952).

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5. The Usefulness of 1-C^{14} Acetate for the Study of Carbohydrate-Fat Synthesis in Fusarium lini Bolley. Arch. Biochem. Biophys. 40, 102 (1952).

6. The Isolation and Characterization of the Native Lignin from Kiri Wood. J. Am. Chem. Soc. 74, 3447 (1952).

7. The Relationship Between the Action of Brown Rot Fungi, Cellulose Degradation and Lignin Composition in Bagasse. J. Am. Chem. Soc. 74, 3326 (1952).

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